Ampex ATR-100 Reproduce Head

Internal Construction

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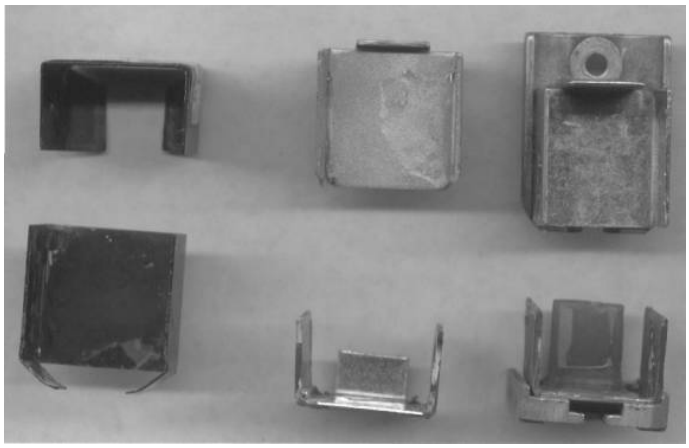
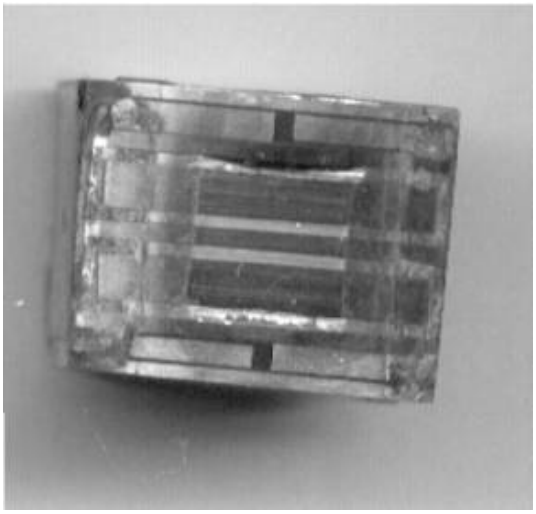
The Ampex ATR-100 metal-faced heads are described below and in the two companion documents.

The reproduce and record heads are enclosed in .025 thick high permeability (Mumetal or equivalent) shielding yokes as pictured below. The sides are fully overlapping, yielding 2 layers of shielding on the sides. The rear tabs partially overlap. The shielding is covered by an anodized aluminum cap that has front wings that extend across the sides of the face of the head. All of these components are glued to the head.

[The units pictured had quite a bit of adhesive between the overlapping flaps, which would significantly increase the reluctance of the shielding paths, reducing the shielding effectiveness.]



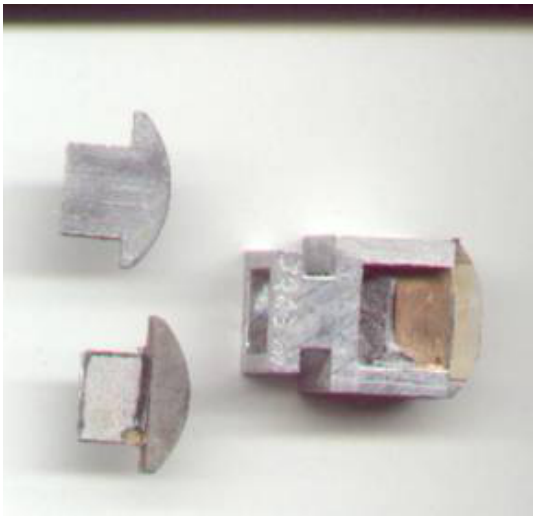
The head assembly pictured below was removed from the shielding for further processing. Note the groove cut into the head by tape.



The head was immersed in Jasco Brand Premium Paint and Epoxy Remover to dissolve the epoxy fillers and adhesives. This process required multiple soakings to remove all of the epoxy. The following photos represent various steps in this sequence.

The outer structure or body of the head consists of a solid aluminum box frame that holds all of the cores, spacers and internal shields. The epoxy remover would eat away the glues and fillers that hold the various components to the frame.

The top and bottom inserts were the first items to come free. These pieces of .075 thick aluminum provide protective caps for the top and bottom of the head.

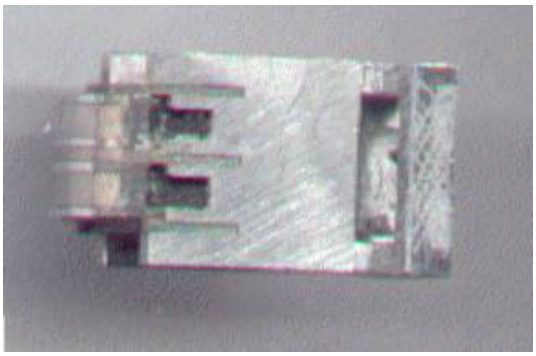


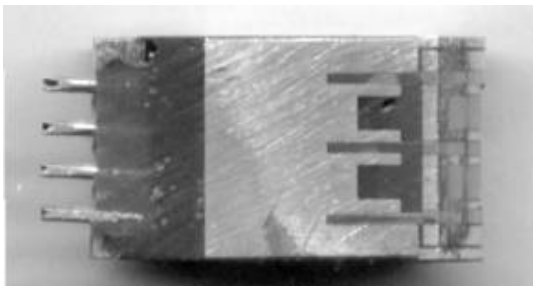
The face of the head separated next. This assembly contains the head pole tips, crosstalk shield tips, and aluminum spacers between the pole tip and crosstalk tips that serve as non-magnetic fillers to isolate

the pole tips from the magnetic short circuit of the crosstalk shields. The fillers and crosstalk shields are continuous strips across the face, but the pole tips have the narrow reproduce gap.

The photo on the right shows the face of the pole piece assembly with the upper track and spacer pulled away from the center crosstalk shield. At the very top, one lamination has been peeled away from the gap area. Note the C-shaped clamps around the outer edges of the lamination stacks. I believe this is part of the fixturing/tooling that holds the lamination stacks during lapping of the gap and prior to the final contouring of the pole tip outlines.

The pole tips at the bottom show the outline of the finished tips. Again, not the clamps at the outer tips.

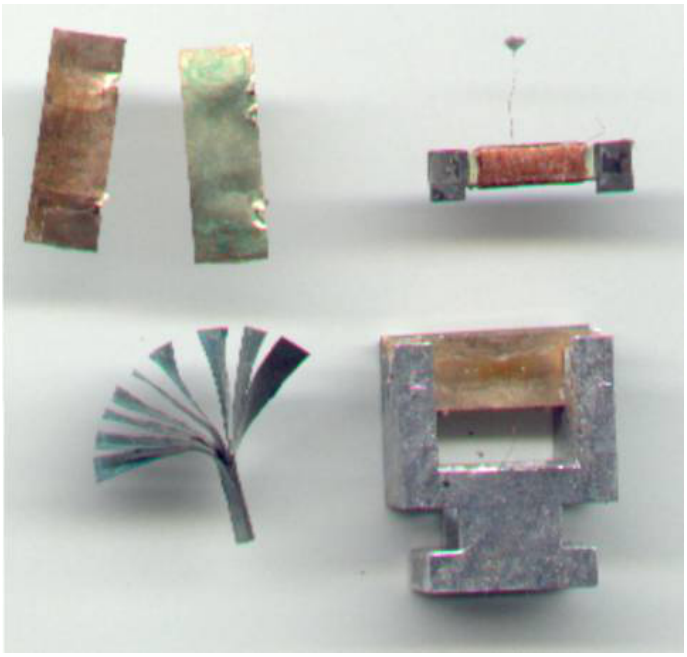




This side view shows the head before processing. Starting from the top right corner, we see the protective cap and then another layer of aluminum that is split at the gap and was probably attached to the pole tips when they were lapped. Next is a shield layer that is apparently a single strip of .032 thick Mumetal. Below the shield sandwich is a .024 thick spacer strip of aluminum to separate the edge shield from the pole tips. Next is the actual stack of pole tip laminations consisting of .002 thick ??. Under the pole tip is another aluminum spacer, followed by another crosstalk shield in the center of the head

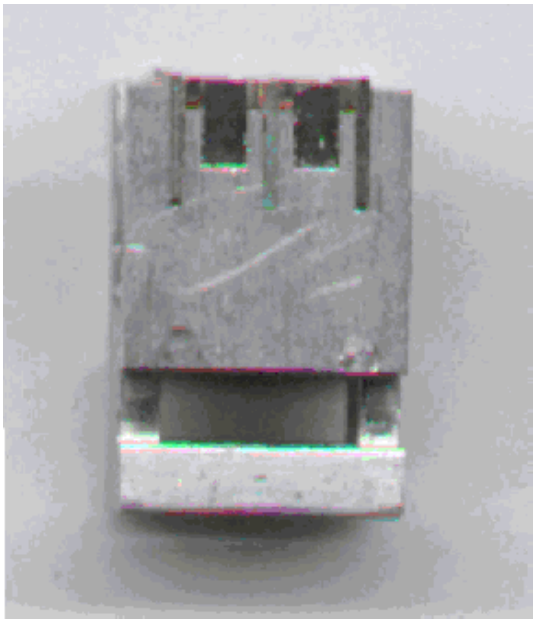
The above description is for the pole tip assembly that is bonded to the aluminum frame containing the ferrite cores and core shields. If we take the same tour from the top of the head looking at the front of the frame after the face is removed, we see a different stack.

At the top we would still find the protective cap. Below the cap we would find a .225 x .650 rectangular shield sandwich composed of a .002 thick sheet of copper, a .020 stack of 9 Mumetal sheets of .002 nominal thickness, and then a final copper sheet.

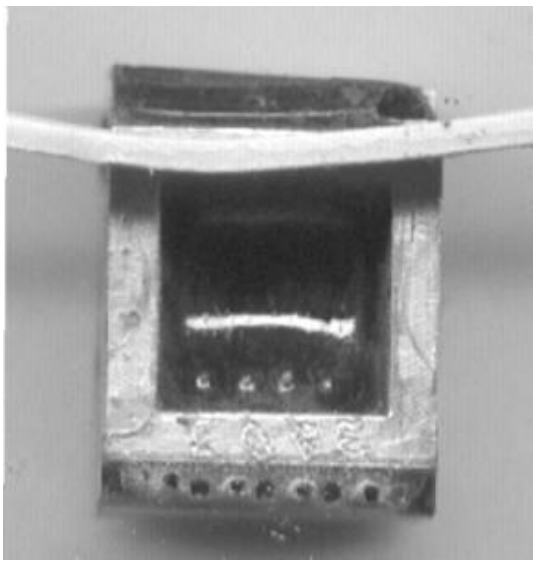


Below the shield sandwich we encounter the .080 thick ferrite pole piece that is about .600 long. The coil, consisting of several layers of very fine wire, covers the center .325 of the core. Below the core, at the center of the head, is another rectangular shield sandwich as described above.

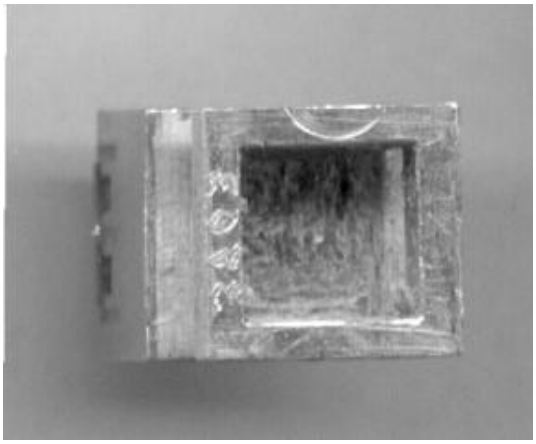
The photo below clearly shows the slots in the aluminum frame that hold the 3 shield stacks and the two black ferrite cores.



The rear of the head is filled with epoxy that holds the terminal pins for connection to the outside world. The strip across the photo is a support to hold the head level on the scanner by compensating for the terminals protruding from the rear of the head.



This rear view shows the aluminum frame after all the epoxy and terminals have been removed.



Consult the accompanying descriptions of the ATR-100 Flux Gate record head and the erase head for additional details on these heads.